Inside Wallops

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NASA Works to Help Pilots Weather the Skies

Most pilots fly an airplane out of their way to avoid atmospheric turbulence, but not a former airliner now outfitted as a NASA flying laboratory.

A 757 research aircraft, based at NASA's Langley Research Center went searching for thunderstorms for eight weeks this spring. Researchers with the NASA Aviation Safety Program (AvSP) were testing a new way to predict turbulence associated with those convective storms.

The Airborne Research Integrated Experiments System (ARIES) aircraft is equipped with an experimental radar system designed to detect atmospheric turbulence by measuring the motions of the moisture in the air.

"NASA is working on an enhanced turbulence detection radar system, which is a software signal processing upgrade to existing predictive Doppler wind shear systems already on airplanes," said Jim Watson, deputy turbulence prediction and warning systems project manager.

To see how well the enhanced radar performed, the 757 and its crew of two dozen researchers and technicians had to find the kind of bumpy weather most airline passengers find uncomfortable.

ARIES flew 13 research missions in search of convective turbulence. The jet would leave NASA Langley and fly to areas where thunderstorms were predicted east of the Mississippi. NASA research pilots circled the thunderstorms repeatedly to subject the plane to rough air.

Inside the 757, researchers at test stations recorded conditions and also alerted the pilots when and where they were likely to encounter turbulence and how much.

Airliners are not currently equipped with turbulence detection systems. "Pilots predict turbulence ahead by experience and intuition, getting information from other airplanes that have encountered turbulence close by and extrapolating the existing weather radar system," Jim Watson, deputy turbulence prediction and warning systems project manager. He added, "I think that we're looking at having some significant improvements on aircraft within the next one to two years."

Atmospheric turbulence is the leading cause of in-flight injuries to airline passengers and flight crews. Federal Aviation Administration (FAA) statistics show that 98 percent of those injuries happened because people were not wearing seat belts. An alert of impending rough air would give pilots time to warn passengers and flight attendants to buckle up and take steps to reduce turbulence effects. Turbulence is not only hazardous, it also costs the airlines money and time, in the form of re-routing and late arrivals.

AvSP is a partnership with the FAA, aircraft manufacturers, airlines and the Department of Defense. This partnership supports a national goal to reduce the fatal aircraft accident rate by 80 percent in 10 years.

Researchers at four NASA field installations are working to develop advanced, affordable technologies to make flying safer: Langley; Ames Research Center at Moffett Field, Calif.; Dryden Flight Research Center in Edwards, Calif.; and Glenn Research Center in Cleveland, Ohio.

NASA Photo.

NASA Langley Research Center's 757 aircraft is equipped with the Airborne Research Integrated Experiments System.

MIDAS/MaCWAVE Campaign Underway

MIDAS (Middle atmosphere Investigations of Dynamics And Structure), a bi-lateral German-Norwegian project with participation from several research organizations in the two countries is currently underway in Norway.

Project scientists for MIDAS are Dr. Tom A. Blix from the Norwegian Defence Research Establishment (FFI), and Prof. Dr. F.-J. Lübken from the Leibnitz-Institut für Atmosphärenphysik (IAP), Kühlungsborn, Germany. In addition, scientists from the University of Colorado at Boulder; the University of Oslo, Norway; and the Technical University Graz, Austria, will be participating in this year's campaign.

The MIDAS payload is to make simultaneous measurements of fine scale structure in neutral air density, ion density, electron density, charged aerosol particle density and electron temperature in the mesosphere and lower thermosphere.

The main scientific objective of the campaign is to study dynamical and physical parameters of Polar Mesosphere Summer Echoes (PMSE) and Noctilucent Clouds (NLC) using a combination of in-situ rocket experiments and ground-based optical, radar and lidar instruments.

MIDAS will be closely coordinated with the NASA Goddard Space Flight Center's (GSFC) MaCWAVE (Mountain and Convective Waves Ascending Vertically) project. The scientific objectives of this project are to perform quantitative studies of gravity wave propagation, their sources in the lower atmosphere and filtering mechanisms by mean and low-frequency winds. Dr. Richard Goldberg, GSFC, Laboratory for Extraterrestrial Physics, is principal investigator for MaCWAVE.

The following rockets are to be launched in the campaign: three Improved Orions for MIDAS, two Terrier-Orions for MaCWAVE, 12 Super Loki falling sphere and 12 Viper IIIA falling sphere.

The MIDAS and MaCWAVE payloads will be launched in a salvo together with meteorological rockets. The total salvo will last for at least 12 hours, depending on weather conditions. The launch window is from June 29 to July 13. Radiosonde balloons will be launched every second hour during the salvoes.

Prevent Solar Skin Diseases

Years of frequent and prolonged exposure of skin to the ultraviolet radiation from the sun results in several changes in the skin. While skin of darker complexion may seem to offer greater protection from acute sunburn, people of all complexions are susceptible to developing skin lesions resulting from the cumulative effects of sun exposure.

Photoaging results from chronic ultraviolet radiation superimposed on intrinsic aging. Photoaged skin usually appears coarse, thickened and pebbly, with prominent wrinkling and irregular hyperpigmentation. In more extreme cases, the affected skin may become severely atrophic with irregular loss of pigmentation, easy bruising and the appearance of small, spidery blood vessels.

Skin malignancies (cancers) are the most serious result of chronic sun exposure. These include basal cell carcinoma, squamous cell carcinoma and malignant melanoma. Malignant melanoma is the least common but, by far, the most dangerous of the skin cancers. A melanoma can invade and/or spread to almost any other tissue in the body. If not diagnosed and treated early, malignant melanoma can result in death within months of appearance. Melanoma also can develop on areas of the body that are never exposed to the sun.

Look for any changes in an existing mole, especially increase in size or changes in color. A melanoma can appear red (inflammation), white (loss of pigment, usually irregularly, due to attack by the body's immune system), and blue or black (increased pigmentation from the malignant cells). Consult your physician if you notice any changes in a pre-existing mole, or the sudden appearance of a new mole. Early recognition and surgical removal of superficial lesions usually results in complete cure.

Basal cell carcinomas are the most common of the skin malignancies. These typically present as a skin sore that does not heal. Left untreated, basal cell carcinomas will continue to expand in size locally, causing destruction of normal skin structures. This can become permanently disfiguring, especially if they involve structures such as the nose or external ears. Most benign skin lesions will heal within two weeks. If you have a sore that persists, especially if the center is ulcerated, consult your physician. Treatment usually involves surgically removing the involved area of skin.

Squamous cell carcinoma is much more likely than basal cell to spread to distant tissues if not treated early. The lesion may appear initially at a sun-exposed area of the skin, but may also occur anywhere on the body, including the tongue and mucosal surfaces (lining cells of the mouth, respiratory tract, vagina, etc.). The lesions are highly variable in appearance - it may be a small, red bump, or a flattened, warty area. Eventually the lesions ulcerate and begin to invade the underlying tissue. It is not unusual for a squamous cell carcinoma to arise within an area of old scar tissue (such as from a previous burn). Early recognition and surgical removal usually results in complete cure.

The best treatment for all sun-related skin conditions is prevention. See a dermatologist for a check-up yearly.

Wallops shorts…….

Congratulations

Larry Duffy, NASA Facilities Management Branch, recently completed the Facilities Engineering Management program offered by the Industrial Extension Service and Office of Professional Development at North Carolina State University in Raleigh.

In the field

Frank Schmidlin, NASA Observational Science Branch, is in Norway to support the launch of 34 meteorological rockets from Andoya Rocket Range as part of MIDAS/MaCWAVE 2002

Observational Science Branch personnel left on June 20 for Naples, Fla., to participate in the Crystal FACE project.

Lunch N Learn
11:30 a.m. to 12:30 p.m.
June 26
Williamsburg Room
Building E-2

Communication Skills

Are you being heard? How are your listening skills? When you tell someone something important, do they actually get what you're trying to say? Learn tips to say what you mean in a way that others will understand.

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From FedWeek
June 19 Issue

New TSP Funds Conclude Rocky First Year

The Thrift Savings Plan's international stock (I) fund and the small and mid-sized U.S. company (S) fund concluded the year in negative territory, with the I fund down 9.67 percent in the 12 months since its inception and the S fund down 5.12 percent. The I fund gained 1.29 percent in May but suffered five losing months out of the 12, including a 9.95 percent loss last September. The S fund lost 2.39 percent in May and had seven losing months, including a 12.5 percent drop last September. However, the returns of those funds still beat the other TSP stock fund, the common stock (C) fund, which has fallen 13.95 percent in the last 12 months after a loss of 0.75 percent in May. The C fund was down in 8 of the last 12 months, including an 8.05 percent loss last September.

F, G Funds Still Top Performers

The bond (F) and government securities (G) funds remain in positive territory, with the F-fund gaining 0.88 percent in May for an 8.19 percent 12-month gain and the G-fund gaining 0.45 percent in May for a 12-month gain of 5.36 percent.

TSP Open Season Dates to Change

The Thrift Savings Plan open season, which started May 15 and ends July 31, will be the last under the cycle the TSP has used since its inception more than a decade ago.

The fall open seasons will run October 15 through December 31. The spring open seasons will start April 15 and end June 30. During open season employees may change the levels of their investments and those not participating in the program may join.

Photo by Berit Bland.

A 1951 Studebaker was one of the vehicles that stopped by the NASA Visitor Center, June 20, during the Chrome & Glidden Tour sponsored by the Veteran Motor Car Club of America. A total of 76 antique cars were on tour.

Inside Wallops is an official publication of Goddard Space Flight Center and is published by the Wallops Office of Public Affairs, Extension 1584, in the interest of Wallops employees. Recent and past issues of *Inside Wallops* also may be found on the NASA Wallops Flight Facility homepage: www.wff.nasa.gov

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